


Conceptual Design Model of Instructional Interfaces: Implications for Usability Evaluation

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ABSTRACT

The study investigates the usability of the proposed model for instructional design on Courseware for Inclusive Education System (C4IES). The usability evaluation on courseware is an important constructivist instructional strategy for inclusive educational systems. The study used the comparative analysis technique to evaluate the usability level of proposed model of C4IES. Then, a field study with observation and survey approach were carried out on randomly selected students among distance learning institutes, whereby a group of students was exposed to non-interactive learning aids, whereas the other group was aided with C4IES prototype. The model has been reviewed by seven experts and validated by 202 respondents from approved distance learning through prototyping. On top of that, the findings of user experience indicated that the C4IES is able to fulfil the instructional interface needs for the non-impaired, low-visual, and hearing-challenged learners in terms of motivation in the use of courseware next time. All these findings demonstrate that the proposed model of C4IES is useful for information accessibility and contributes to the designing of instructional design.

KEYWORDS

Instructional Interface, Layout, Navigation, Structure, Usability Strategies

1. INTRODUCTION

Instructional is regarded as an innovative design technique for learning. It is the main aspect to be considered when developing any courseware. How useful the product is, is the main objective of usability. Researchers have considered instructional interface as a fundamental part to determine the quality of users' interaction with educational system, and it has become an important process to enhance the product utility (Roslinda & Halimah, 2011, Tosho, 2015; Mafukata & Tshikolomo, 2019). In designing of courseware, an instructional interface is required to ensure the effectiveness for the intended users. The advantage of using instructional strategies to create the effectiveness and efficiency is usually obvious in the courseware design (Zhang, 2012; Abdulrauf, Ariffin & Sobihatun, 2015). The appropriate nature of incorporating instructional usability strategies in courseware design makes it easier for students to understand the course content and interact with the designed interface (Abdollah, Ahmad & Akhir, 2012).

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However, instructional strategies are seldom used in the courseware interface design (Yueh, Chen, Lin & Sheen, 2014) owing to the fact that the courseware often involves a learning process that needs interactivity in the user interface (Deng, 2010). Moreover, the courseware interface is often not supportive and it's complex to be used by challenged learners (Nurulnadwan, Ariffin & Siti Mahfuzah, 2014). Therefore, the courseware interface design has not made a breakthrough from the instructional design that is applicable for challenged learners. Very often, instructors orally describe an action and support with language translators for self-training after lectures (Liu, 2010).

In spite of the rapid growth in the instructional design, there is a little concern about the effectiveness and efficiency of the strategies in interface design. At present, there are several problems in the area of usability measures for instructional design of courseware interface. For instance, the learning content is rather vague, poor accessibility, and the content lacks motivational elements for learning (Lyashenko, 2010). In the area of content acquisition, challenged learners have difficulties in using available tools to guide their learning (Ng, Bakri & Rahman, 2015; Toshio, Mutalib & Abdul-Salam, 2016), and instructive learning methods are often not that effective (Cook et al, 2013). As a result, many negative results regarding instructional interface usability are often reported in literatures; such as learners' learning interest is often low (Liu et al., 2011; Osman, Sahari & Zin, 2012, Toshio, Mutalib & Abdul-Salam, 2016); there is a lack of motivation from the design elements (Abdulrauf, Arffin & Subhatun, 2014); and the learning mode in the instructional design and navigation accessibility are rigid for e-learning users (Sung, Chang & Yu, 2011.).

With the extensive design of instructional interface and how to effectively combine instruction design with usability strategies is still in its infancy (Abdulrauf, Arffin & Subhatun, 2016). The major benefits that are associated with evaluation are not actualized. More so, Usability evaluation should be performed iteratively not at once-off activity, by applying different suitable techniques throughout the stages of a product's development life cycle. This study attempted to measure the effectiveness and efficiencies of the proposed Model for C4IES. This needs to be part of usability strategies to motivate the learners in utilizing the courseware among the distance learning.

2. METHODOLOGY

In this study, a sequence of activities (problems analysis, elements identification, model development, and evaluation) was carried out. In the first phase, the activities include interview with courseware designer (instructors) and comparative analysis through User Centered Design (UCD) approach. From this phase, data regarding the multimedia elements, strategies, and design principles for C4IES were gathered from available courseware for both non-challenged learners and challenged learners. Then, the elements were merged to serve as instructional interface elements for the conceptual model. This merging system was achieved based on theoretical constructs to learning object systems, and synthesis-oriented approach that combines elements of instructional strategies into a more holistic representation of instructional system (Abdulrauf, Ariffin, and Sobihatun, 2015).

In view of this, instructional component is represented by interface design and instructional strategies. The components dictate various elements representing specific instructional strategies within which a set of knowledge objects can be displayed for the learner. In addition, the relationships between objects can be formulated as well, using a defined terminology to assist challenged learners. In this system, the designer needs to accurately describe the element, and the learners need only to choose the instructional strategy he or she prefers. Then, the courseware automatically generates a presentation, exploration, simulation or practice strategy using the same learning content. At this point, the first objective of the study was achieved. Also, the second objective to identify elements of the instructional interface for C4IES were achieved too. The third phase is model development, in which a Conceptual Design Model of C4IES was developed based on the data gathered in phase one and two. At this stage, this study has achieved its third objective. The final objective of the study is achieved through evaluation. Having finished the fourth phase, the whole objectives of this study are

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